

$\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ variations of bulk sediments at IODP Exp. 355 Site U1456: Preliminary results to provenance and productivity

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Two sites (U1456 and U1457) were drilled in Laxmi Basin in the eastern Arabian Sea during International Ocean Discovery Program Expedition 355. Drilling penetrated to 1109.4 m below seafloor (mbsf) at Site U1456 (16°37.28'N, 68°50.33'E; ~3640 m water depth), with the oldest sediment dated to 13.5–17.7 Ma (late early to early middle Miocene). A long hiatus separates this lowermost sediment from overlying deposits dated to <10.9 Ma. Four major lithologic units were defined for Site U1456: Unit I (~121 m thick Pleistocene nannofossil ooze interbedded with thin turbidites), Unit II (~240 m thick upper Pliocene to lower Pleistocene massive sand and silt interbedded with thin nannofossil-rich clay), Unit III (~370 m thick upper Miocene to lower Pliocene semi-indurated to indurated clay/claystone and sand/sandstone with nannofossil chalk and nannofossil-rich claystone), and Unit IV (~380 m thick Miocene massive claystone and calcareous debrites, most of which were deposited as a large mass transport unit, the Nataraja Slide). For the present study, 113 squeeze cake samples were used to measure $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of bulk sediment. $\delta^{13}\text{C}$ values of bulk sediment mostly range between -19‰ and -23‰, indicating marine origin, but the lower parts of Unit II and Unit IV are characterized by low $\delta^{13}\text{C}$ values (<-24‰), which indicate significant terrestrial contribution. $\delta^{15}\text{N}$ values of bulk sediment are relatively consistent throughout the section (4–6‰, with some fluctuations). However, a distinct increase to $\delta^{15}\text{N}$ values >8‰ at the Unit II/III boundary, as well as within Unit I, indicates the development of an oxygen minimum zone associated with denitrification similar to the present day. These $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ data will also contribute to study of provenance and productivity variations through time recorded in the core.